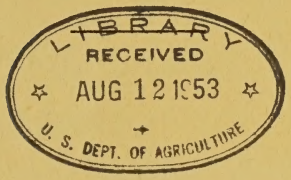
NORTH CAROLINA 21 SAMPSON

FIELD APPRAISAL ANALYSIS

Prepared by
Field Appraisal Section
Program Analysis Division
RURAL ELECTRIFICATION ADMINISTRATION



Field Appraisal
Completed in
April 1953

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June 15, 1953

Field Appraisal Section
Program Analysis Division

SUMMARY AND CONCLUSION
NORTH CAROLINA 21 SAMPSON

AREA CHARACTERISTICS

The population of this area has increased by 5 percent during the decade 1940-1950. During this same period, farm population decreased by 11 percent, while nonfarm population increased by 60 percent. The major source of agricultural income in 1949 was from the sale of crops, principally tobacco. The trend, however, is toward a decrease in importance of cash crops and an increase in importance of livestock enterprises. The number and average size of farms have been increasing. Average value of land and buildings was $4,774 in 1950, or 85 percent higher than in 1945. Gross income from the sale of farm products in 1949 averaged $1,863. In 1950, about 62 percent of the farms were owned in full or in part. Twelve percent of the farm operators worked 100 or more days off the farm, and 17 percent reported other income of the family exceeding the value of farm products sold in 1949. Sale of forest products supplements income from crops and livestock. Commercial lumbering operations provide a source of off-farm work and add other income to farm earnings. The topography ranges from nearly level to undulating, with occasional low ridges and gentle slopes. Soils consist principally of sand, silt, and clay, with some marl and gravel and accumulations of peaty material.

ULTIMATE NUMBER OF CONSUMERS

On March 31, 1953, this cooperative was serving 8,568 consumers. The manager has estimated that in 1961 a total of 11,007 consumers will receive service. A random sample of consumer units developed for the survey was used to appraise the manager's estimates. From a careful consideration of related factors believed to be significant, an estimate of 10,194 ultimate consumers appears reasonable.

ESTIMATED FUTURE CONSUMPTION OF ELECTRICITY

This cooperative was energized in 1938. Since 1939, average monthly farm consumption increased from 31 kwh to 123 kwh in 1952. For consumers who were connected 10 or more years and were interviewed in connection with this study, consumption increased from 55 kwh in 1943 to 202 kwh in 1952. Farm consumers indicated that they expected to increase their use of electricity 51 percent by 1956. Nonfarm consumers indicated an increase of 57 percent during the same period. About 90 percent of the indicated increase in use is expected to occur in the household.

The low farm income, active competition with LP gas, the supply of wood for use as fuel, and the problem of low voltage are all serious deterrents to future use of electricity in the area. The survey indicated that 25 percent of the consumers were using gas for one or more purposes and that an additional 2 percent planned to use gas sometime in the future.

Based on factors believed to be significant, this analysis leads to the following estimates, which are certified as being reasonable and may be expected to be attained in the years specified.

Class of Consumer	Calendar Year 1952	1955	1958	1963
Farm	123	165	195	230
Nonfarm Residential	123	145	165	190
Small Commercial	239	290	320	375
Public Buildings	37	50	60	75
Large Commercial (annual)				
Nunnally Lumber Co. (35 kw)	6,720 1/	13,000	13,500	14,000
Highsmith's Mill, Lumber Co. (150 kw)	72,700	100,000	100,000	100,000
Lake Tut, Summer Resort (30 kw)	21,728 2/	24,000	26,000	28,000
Green Bros. Lumber Co. Standby Service (100 kw)	4,400	4,500	4,500	4,500
Burgaw Ball Park (162 kw)	28,800	30,000	30,000	30,000
Volunteer Cement Co. (375 kw)	potential	500,000	500,000	500,000

1/ 8 months consumption.
2/ Connected 6 months.

Robert D. Partridge, Assistant Chief
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June 15, 1953

Field Appraisal Section
Program Analysis Division

ANALYSIS OF BASIC ECONOMIC FACTORS RELATED TO LONG RANGE PLANNING FOR NORTH CAROLINA 21 SAMPSON

This analysis of basic economic factors related to future consumption of electricity by consumers of the Four-County Electric Membership Corporation, with headquarters at Burgaw, North Carolina (Figure 1), is based on a field study conducted by Earl A. Gardner and William B. Kingree, Agricultural Economists, Field Appraisal Section, Program Analysis Division, and was completed in April 1953. This analysis was prepared by Mr. Kingree. The field work consisted primarily of interviews with 300 served and prospective consumer units. Of these, 224 were served farm consumers, 50 were served nonfarm consumers, 8 were served small commercials, 2 were served large commercials, and 16 were potential farm and nonfarm consumers.1/ In addition, local bankers and agricultural leaders were consulted regarding local economic trends. Supporting economic data were obtained from the U. S. Census for Bladen, Duplin, Pender, and Sampson Counties.

ULTIMATE NUMBER OF CONSUMERS

On March 31, 1953, the cooperative was serving 8,568 consumers. The manager has estimated that in 1961 a total of 11,007 consumers will be served (Figure 2). This represents an increase of 28 percent over those presently receiving service. The total number, according to the manager, includes anticipated consumer units due to increased habitation in the area, as well as those presently served who are expected to remain.

The number of the various units as disclosed by an expansion of the sample data is compared with the manager's estimate in Table I. A consideration of the adjusted survey findings in conjunction with the manager's estimate tends to support an estimate of 10,194 as ultimate.

1/ Note on representativeness of the sample. Respondents in the survey were randomly selected and comprise an area sample of approximately 4 percent of the consumer units (excluding those receiving service from other sources) existing in the system area. Farm consumers in the sample actually averaged 138 kwh per month during 1952. This is approximately 12 percent above the average of 123 kwh per month for all farm consumers for the same period. Since the standard deviation of the sample was 136 kwh, the sample mean of 138 kwh does not differ significantly from the true mean of 123 kwh: $t = \frac{138-123}{8.96} = 1.67$ where tabular $t_{.05} = 1.973$. A comparison of connections of all consumers with that of respondents is as follows:

Time Connected	All Consumers	Respondents in Sample
Before 1944	22.4%	20.5%
1944-1948	29.0%	27.5%
1949-1953	48.6%	52.0%

Summarizing, this sample appears to be sound for use in establishing estimates of future consumption of electricity for this system.

TABLE I

DISTRIBUTION OF CONSUMER UNITS WITH RESPECT TO ELECTRIC SERVICE

Class	Number in Sample	Expanded Number[a/]	Manager's Estimate	Estimated Number
Served				
Farm	224	5,712	7,190	7,190
Nonfarm	50	1,275	736	736
Lodges	--	--	35	35
Small Commercial	8	204	366	366
Schools	--	--	34	34
Churches	--	--	203	203
Large Commercial	--	--	4	4
Potential				
Farm	13	332	(1,690	873
Nonfarm	3	77	(	203
Other				
Idle Services	17	434	749	500
Vacant	1	25	--	25
Not Interested	1	25	--	25
Abandoned	19	485	--	--
Total Units	336		11,007	
Total Estimated Ultimate Consumers of Electricity				10,194

a/ Derived by expanding sample data.

NATURE OF PRESENT AND INDICATED FUTURE CONSUMPTION OF ELECTRICITY AS REVEALED BY THE SURVEY

A tabulation of the raw data obtained from the respondents revealed that the indicated present average farm consumption is 153 kwh per month and that the indicated future (1956) average consumption will be 231 kwh per month. This represents an increase of 51 percent in 3 years. Respective averages for the nonfarm consumers in the survey were 139 and 218 kwh, representing a 57 percent increase over the same period. The data revealed that for farm and nonfarm consumers combined, the indicated present average consumption is 151 kwh per month and the indicated future (1956) average consumption will be 228 kwh per month, amounting to an over-all increase of 51 percent.

Table II shows this information by system subareas and has been prepared at the request of the cooperative management. Although the sample was not drawn to reflect estimates on subareas, the respective increases indicated by areas should provide indicators as to the variation in future consumption of electricity and be of some value in designing the future system.

TABLE II

INDICATED MONTHLY KWH CONSUMPTION[a]

Area	Farm			Nonfarm		
	Present	Future[b]	%Increase	Present	Future[b]	%Increase
1	173	249	44	240	399	66
2	201	291	45	273	339	24
3	107	198	85	106	278	162
4	188	255	36	93	242	160
5	175	274	57	67	68	1
6	165	245	48	56	56	---
7	88	159	81	102	142	39
8	199	255	28	160	269	68
9	134	238	78	88	130	48
10	126	203	61	159	223	40
11	124	199	60	61	340	457
All Areas	153	231	51	139	218	57

a/ Based on indications by respondents in the survey and average energy requirements as determined by REA on a country-wide basis.

b/ Based on what respondents expect to add in 3 years and indications of potential consumers in the sample.

Historical consumption records for farm and nonfarm consumers in the survey indicate a generally rising consumption. Consumers added in recent years have attained initial averages higher than consumers connected over a longer period. According to data in Tables II and III, consumers are using only 91 percent of the average kwh per appliance as determined by REA for the country at large.

TABLE III

AVERAGE MONTHLY KWH CONSUMPTION OF 229 FARM AND NONFARM CONSUMERS

Total Number of Years With Electricity	Number of Schedules	Average Kwh Consumption Per Month													
		1939	'40	'41	'42	'43	'44	'45	'46	'47	'48	'49	'50	'51	'52
14	2	25	29	33	32	30	32	36	45	47	49	53	54	62	69
13	3	--	25	30	30	36	38	51	62	93	137	178	178	192	203
12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
11	41	--	--	--	45	58	58	66	67	92	103	126	139	188	206
10	1	--	--	--	--	56	73	67	100	100	114	149	169	282	283
9	2	--	--	--	--	--	28	34	38	38	45	59	88	184	197
8	2	--	--	--	--	--	--	41	41	40	43	58	76	86	181
7	3	--	--	--	--	--	--	--	25	91	149	147	155	189	281
6	9	--	--	--	--	--	--	--	--	81	132	139	147	184	230
5	47	--	--	--	--	--	--	--	--	--	38	55	64	78	106
4	22	--	--	--	--	--	--	--	--	--	--	64	61	82	100
3	48	--	--	--	--	--	--	--	--	--	--	--	73	96	122
2	21	--	--	--	--	--	--	--	--	--	--	--	--	72	95
1	28	--	--	--	--	--	--	--	--	--	--	--	--	--	132
Weighted Average		13	27	31	43	55	55	62	62	86	77	90	92	115	139

A saturation of electrical appliances and equipment, measured in terms of the percent of consumers presently having them and a corresponding percent anticipated in the future was compiled from field schedules. The difference in saturation, as revealed by the increase in percentage points, was converted to future kwh requirements per 100 consumers for each appliance and piece of equipment. This tabulation is shown in Table IV.

TABLE IV

PRESENT AND INDICATED SATURATION OF ELECTRICAL APPLIANCES AND EQUIPMENT AND CORRESPONDING INDICATED INCREASE IN KWH USAGE OF FARM AND NONFARM CONSUMERS

Appliance or Equipment	Farm: Percent of Consumers[A]: Presently Using	Farm: Percent of Consumers[A]: Indicating Future Use	Farm: Increase[B]: Percentage Points	Farm: Increase[B]: KWH Usage Per 100 Consumers	Nonfarm: Percent of Consumers[A]: Presently Using	Nonfarm: Percent of Consumers[A]: Indicating Future Use	Nonfarm: Increase[B]: Percentage Points	Nonfarm: Increase[B]: KWH Usage Per 100 Consumers
Air Conditioning Unit	—	1	1	2,000	—	—	—	—
Animal Clipper	1	2	1	3	—	—	—	—
Blanket	2	3	1	150	6	6	—	—
Broiler	1	2	1	50	—	—	—	—
Brooder (Hover)	24	27	3	324	8	15	7	924
Churn	6	6	—	—	2	2	—	—
Clock	18	22	4	72	23	25	2	36
Coal Stoker (For Tobacco Curing)	2	2	—	—	—	—	—	—
Corn Sheller	—	1	1	5	—	—	—	—
Dishwasher	—	—	—	—	—	2	2	60
Drill Press	3	7	4	48	4	6	2	24
Evaporative Cooler	—	—	—	—	—	2	2	144
Fan (Attic)	—	1	1	100	—	—	—	—
Fan (Cen. Hot Air)	2	3	1	240	4	8	4	960
Fan (Exhaust)	—	—	—	—	2	4	2	30
Fan (Household)	27	38	11	165	40	47	7	105
Fan (Window)	—	1	1	50	4	6	2	100
Fence	21	29	8	400	6	6	—	—
Food Mixer	6	11	5	125	8	15	7	175
Forge	—	1	1	12	—	—	—	—
Freezer (Cabinet)	19	34	15	13,500	6	23	17	15,300
Garden Watering	6	8	2	150	4	6	2	150
Heating Pad	10	10	—	—	11	11	—	—
Hot Plate	10	14	4	280	11	13	2	140
Incubator	—	—	—	—	—	2	2	300
Iron	90	94	4	400	85	91	6	600
Ironer	—	—	—	—	—	2	2	240
Lathe	—	1	1	12	2	2	—	—
Lawn Mower	—	—	—	—	—	2	2	20

Appliance or Equipment	Farm: Percent of Consumers[A]: Presently Using	Farm: Percent of Consumers[A]: Indicating Future Use	Farm: Increase[B]: Percentage Points	Farm: Increase[B]: KWH Usage Per 100 Consumers	Nonfarm: Percent of Consumers[A]: Presently Using	Nonfarm: Percent of Consumers[A]: Indicating Future Use	Nonfarm: Increase[B]: Percentage Points	Nonfarm: Increase[B]: KWH Usage Per 100 Consumers
LIGHTING								
Dairy Barn	2	3	1	35	—	—	—	—
Garage	3	4	1	8	4	6	2	16
General Barn	8	13	5	120	2	2	—	—
Hog Barn	—	1	1	3	—	—	—	—
House	95	100	5	1,200	94	100	6	1,440
Other Buildings	12	18	6	72	2	2	—	—
Poultry Brooder House	4	6	2	10	4	4	—	—
Poultry Laying House	2	4	2	70	—	—	—	—
Shop	3	4	1	12	2	2	—	—
Tobacco Barn	6	10	4	40	—	—	—	—
Yard	5	9	4	72	—	—	—	—
Livestock Watering	21	33	12	2,160	4	4	—	—
Milk Cooler	—	2	2	3,506	—	—	—	—
Milking Machine	—	2	2	896	—	—	—	—
Oil Furnace	1	1	—	—	2	4	2	600
Percolator	11	17	6	360	11	17	6	360
Pig Brooder	—	1	1	108	—	—	—	—
Power Saw	3	6	3	36	9	11	2	24
Pressure System (Less than 22')	30	50	20	3,600	28	34	6	1,080
Pressure System (Greater than 22')	8	10	2	480	2	6	4	960
Radio	84	94	10	1,000	85	94	9	900
Range	25	44	19	22,800	30	45	15	18,000
Refrigerator	74	86	12	4,320	72	81	9	3,240
Sewing Machine	6	10	4	40	4	8	4	40
Soldering Iron	2	3	1	15	6	6	—	—
Space Heater	1	2	1	70	6	8	2	140
Tea Kettle	—	1	1	150	—	—	—	—
TV Receiver	2	10	8	2,880	—	6	6	2,160
Toaster	14	18	4	140	15	21	6	210
Tobacco Curing	1	1	—	—	—	—	—	—

Appliance or Equipment	Farm: Percent of Consumers[A]: Presently Using	Farm: Percent of Consumers[A]: Indicating Future Use	Farm: Increase[B]: Percentage Points	Farm: Increase[B]: KWH Usage Per 100 Consumers	Nonfarm: Percent of Consumers[A]: Presently Using	Nonfarm: Percent of Consumers[A]: Indicating Future Use	Nonfarm: Increase[B]: Percentage Points	Nonfarm: Increase[B]: KWH Usage Per 100 Consumers
Tool Grinder	5	8	3	75	2	4	2	50
Vacuum Cleaner	6	12	6	120	8	15	7	140
Waffle Iron	5	5	—	—	4	4	—	—
Washing Machine	68	79	11	385	49	68	19	665
Water Heater (with bath)	10	21	11	33,000	9	26	17	51,000
Water Heater (without bath)	1	4	3	7,200	2	4	2	4,800
Water Heater (dairy-pour-in)	—	1	1	1,500	—	—	—	—
Welder	—	1	1	75	—	—	—	—
Wood Saw	—	1	1	30	—	—	—	—

A/ Based on indications of presently connected and potential consumers.

B/ Based on average energy requirements determined by REA. Data do not reflect instances where more than one of the same appliance exist per consumer. These cases are rare and do not affect the over-all pattern materially.

ECONOMIC CHARACTERISTICS

U. S. Census data on Bladen, Duplin, Pender, and Sampson Counties indicate that there was a 5 percent increase in the total population during the period 1940-1950. Farm population decreased by 11 percent, while the nonfarm population increased by 60 percent and city population (Clinton, North Carolina) increased by 24 percent.

Approximately 55 percent of the land area in the four counties was classified as farm land in 1950. Of the total farm acreage, about 58 percent was classified as woodland some of which was used for pasture in 1949. According to the U. S. Forest Service, the latest survey (1930) of the four counties indicates that approximately 44 percent of the total land area is in forest. It is assumed that the remainder of the land area is in roads, towns, and villages.

Land is presently being cleared on a limited scale in each of the four counties. In many instances the clearing operations are small plots to be used for tobacco beds.

From 1945-1950, the number of farms in the four counties increased by slightly more than 3 percent, while the average size of farms increased by 15 percent. The average value of land and buildings in 1950 was $4,774, as compared with $2,580 in 1945. Compared with the State of North Carolina, the four counties as a whole in 1950 had 6 percent less of the land area in farms, a 26 percent lower average valuation of land and buildings, and about the same average size of farms.

Average gross farm income in the four counties as a whole was $1,778 in 1944 and $1,863 in 1949, as compared with the State average of $1,701 in 1944 and $1,929 in 1949. In 1949, the sale of crops accounted for 88 percent of the farm income in the four counties, as compared with 92 percent in 1944. Sale of tobacco leaf in 1949 accounted for three-fourths of the average cash crop income and two-thirds of the average gross farm income. Produce is important in localized areas within the four counties. In 1949, sale of these commodities amounted to 5 percent of the average cash crop income. The sale of livestock and livestock products accounted for approximately 10 percent of the average gross farm income in 1949, as compared with 8 percent in 1944. During the period 1945-1950, the total numbers of chickens, cattle, and calves on farms declined while the numbers of hogs showed a substantial increase. In contrast to the foregoing statement, dairy and beef cattle enterprises in the Four-County Electric Membership Corporation area are increasing in number.

The sale of forest products accounted for about 2 percent of the farm income in 1949 and for less than 1 percent in 1944. Commercial lumbering operations, however, are conducted extensively throughout the four counties. Although soft woods, such as loblolly and short leaf pine predominate, hardwoods, such as oak and gum, are also important. Lumber manufactured at the local sawmills is either shipped by motortruck or rail to its destination. From the standpoint of revenue, commercial lumbering operations are very important to the economy of the area.

In 1950, about 62 percent of the farms in the four counties were owned in full or in part. In 1945, 90 percent of the farm operators, as compared with 93 percent in 1950, resided on the farm they operated. Off-farm work is important and apparently is increasing. About one-third of the farmers worked off the farm in 1949, while approximately one-eighth did so in 1944. Twelve percent of the operators in 1949, as compared with 6 percent in 1944, worked 100 or more days off the farm. About 17 percent of the operators reported other income of the family exceeding the value of farm products sold in 1949.

Opportunities for off-farm employment are found at Camp Lejune in nearby Onslow County, at the marine terminal in Wilmington, at industrial establishments in and near Wilmington, and in local industrial establishments involving the manufacture of lumber and lumber products, textiles, and perfume, and the processing of food and kindred products. In addition, the construction of a cement manufacturing plant near Burgaw, North Carolina, is planned for the near future.

Data available on a county basis for one of the 3 Production Credit Associations operating within the four counties indicates that loans made to 225 members average $889 each. In the nine months ending February 28, 1953, the National Farm Loan Association had made 70 loans totalling $227,400 in three of the four counties. Data obtained from Farmer's Home Administration Offices in three of the four counties indicate that 520 loans totalling $1,156,510 had been made as of December 31, 1952. These loans were classified as follows: 269 production and subsistence loans averaging $1,526, 94 disaster loans averaging $872, 119 farm ownership loans averaging $3,571, and 38 farm housing loans averaging $6,289. According to banks visited in the area, the ratio of loans to deposits was 1.0 to 2.9. One banker indicated that about 50 percent of his loans and discounted paper were for agricultural purposes.

There are numerous swine markets located within the service area. Auction markets for tobacco leaf and produce appear to be adequate. Turkey production, in its infancy in the area, appears to be increasing. The manager of this system advises that turkey producers are planning to form a marketing association.

Railroads and highways traverse the area. All of the main roads and some of the secondary roads are hard-surfaced. The secondary roads generally are narrow and winding and those which have not been hard-surfaced are not gravelled. The road network, however, appears to be adequate.

Deposits of brown iron ore, marl, and clay have been reported in the area. The proposed cement manufacturing plant at Burgaw will utilize deposits of marl and clay in Pender County.

PHYSICAL CHARACTERISTICS

The service area is located on the Coastal Plain of Southeastern North Carolina and consists of parts of Bladen, Duplin, Pender, and Sampson Counties. The topography ranges from nearly level to undulating, with occasional low ridges and gentle slopes.

The nearly level topography is encountered in the depressions, lakes, and swamps and is intersected by broad, slow moving streams and rivers. The slopes leading to the drainage ways are mostly gradual, although in places along the larger streams there are a few steep and broken areas. The more elevated portions of the area are more completely penetrated by stream tributaries than the lower portions; consequently, they are better drained.

Soils of the area consist principally of sand, silt, and clay, with some marl and gravel and accumulations of peaty material. Run-off water easily penetrates the sandy loams on the higher elevations; on lower elevations drainage presents a problem and ditching is quite common.

Average annual precipitation in the four counties is 48 inches with 67 percent falling during the months of April through October. The growing season averages 206 days.

ANALYSIS OF FUTURE CONSUMPTION

This system was energized in 1938. Since 1939, average monthly farm consumption increased from 31 kwh to 123 kwh in 1952. This is an increase of about 7 kwh in average monthly usage for each year. Table III shows that new consumers are being added at levels of consumption of approximately twice that of the initial consumption of the earlier consumers.

If consumption is to increase at the rate indicated in Table II, we might expect an average monthly farm figure of 186 kwh (123 x 1.51). The average monthly nonfarm figure would be 193 kwh (123 x 1.57). To achieve these increases, the specific additional kwh resulting from indicated future saturation of appliances and equipment as shown in Table IV must be attained.

Approximately 90 percent of the indicated increased use for farm consumers would need to occur in the household (Table V). Furthermore, nearly three-fourths of the indicated increase would need to occur as a result of the addition of freezer cabinets, ranges, and water heaters.

There are other factors which must be considered in arriving at estimates of electric consumption. Among these are (1) the extent to which LP gas competition is likely to reduce the indicated future increases in electrical usage, and (2) other related economic trends and their impact upon the indicated future consumption.

TABLE V

INDICATED AND ESTIMATED KWH USAGE, FARM CONSUMERS BY CHARACTER OF LOAD PER 100 CONSUMERS

Use	Indicated Future Saturation	Indicated Increase a/	Percent of Indicated Increase	Estimated Increase	Present Use	Estimated Future Total
Major Household Uses						
Water Heater	25	36,582	39.2	18,291	29,484	47,775
Range	44	21,840	23.4	10,920	27,300	38,220
Freezer Cabinet	34	11,466	12.3	8,026	15,561	23,587
Refrigerator	86	3,931	4.2	3,538	24,242	27,780
Pressure System (less than 22')	50	3,112	3.3	1,867	5,078	6,945
Television Receiver	10	2,621	2.8	262	655	917
Air Conditioning Unit	1	1,820	2.0	91	--	91
House Lighting	100	1,092	1.2	1,092	20,748	21,840
Radio	94	910	1.0	910	8,281	9,191
Major Productive Uses	--	7,099	7.6	4,969	8,162	13,131
All Other Uses	--	2,846	3.0	1,423	16,291	17,714
Total	--	93,319	100.0			
Estimated annual average increase (total) kwh consumption per 100 consumers - 1956				51,389	--	207,191
Estimated annual average increase (total) in kwh consumption per consumer - 1956				514	--	2,072
Estimated monthly average increase (total) over a 3-year period - 1953-1956				43	--	173

a/ Adjusted. Appliance usage and amount of electricity required is 91 percent of average for the United States as determined by REA.

Table VI indicates that 24 percent of the consumers are presently using LP gas for one or more purposes. Two percent have indicated their intention to use LP gas in

the future. In addition, one percent are using natural gas, while 73 percent indicated they had no intention of using either LP or natural gas in the future. One percent of the respondents using gas indicated plans to change to electricity within the next 3 years.

TABLE VI

STATUS OF LP AND NATURAL GAS USE OF
265 RESPONDENTS REPORTING IN THE SURVEY

Consumers' Position With Respect to Use of Gas		Number in Survey	Percent of Total
Not Using and Not Planning to Use		193	73
Not Using but Planning to Use		5	2
Presently Using:			
LP Gas		64	24
Natural Gas		3	1
			100
Planning to Change to Electricity in the Future		3	1
Used for:	LP Gas	Natural Gas	
Cooking	64	3	
Water Heating	13	2	
House Heating	13	1	

REA consumers presently using LP gas for cooking and water heating may be divided roughly into two classes. Those who intend to continue to use gas equipment acquired prior to receiving electric service, until it is worn out, and those who are mobile tenants. The latter almost invariably maintain that it requires less effort and causes less inconvenience when moving from one farm to another to transport the gas equipment. The basic reason for this is the fact that they can disconnect and re-connect the gas appliances whereas with electric appliances they must wait for the cooperative to re-run the service to the tenant house. According to the respondents in the survey, the retail price for LP gas ranges from 20 to 22 cents per gallon.

The existing rate schedules for farm and nonfarm consumers are as follows:

FARM AND HOME SERVICE

First	25 kwh or less per month	@$2.00 (minimum)
Next	25 kwh per month	@.05 per kwh
Next	50 kwh per month	@.03 per kwh
Next	100 kwh per month	@.02 per kwh
Over	200 kwh per month	@.015 per kwh

FARM AND HOME CONTROLLED WATER HEATER SERVICE

With Electric Range

"If the customer has installed and used an electric range and the total usage for all service in any month is 500 kwh or more, the last 300 kwh will be billed at the rate of 1.2 cents per month. If the total usage for all service in any month is less than 500 kwh, only that portion of the total usage in excess of 200 kwh will be billed at the rate of 1.2 cents per kwh."

Without Electric Range

"If the customer does not have an electric range and the total usage for all service in any month is 400 kwh or more, the last 300 kwh will be billed at the rate of 1.2 cents per kwh. If the total usage for all service in any month is less than 400 kwh, only that portion of the total usage in excess of 100 kwh will be billed at the rate of 1.2 cents per kwh."

Additional use of electricity resulting from ranges depends on the supply of wood in the area. Another factor affecting use is the complaint among some of the present range owners of low voltage. Since the farm income in the area is primarily dependent upon receipts from crops, acquisition of additional appliances is affected by bad weather and other hazards to production of these crops.

Trends in the area relative to the State (Table VII) indicate that the service area is slowly decreasing in importance in spite of its absolute increase. This is reflected in the less favorable relation of farm income and value of land and buildings reported in 1950, as compared with earlier periods. Livestock enterprises in the area apparently have not kept pace with the State. Power costs rose steadily, both absolutely and relatively, from 1941 until 1951, while at the same time average consumption increased steadily. The apparent recent reduction in wholesale power cost should eventually effect a reduction in retail rates. This should encourage greater use of electricity generally.

TABLE VII

TRENDS RELATED TO THE RATE OF INCREASE IN USE OF ELECTRIC POWER

Item and Relationship	Trend							
Population	1920		1930		1940			1950
Service Area	100,774		113,260		132,045			138,980
State of North Carolina	2,559,123		3,170,276		3,571,623			4,061,929
Ratio Area to State	.039		.036		.037			.034
Number of Farms	1910	1920	1925	1930	1935	1940	1945	1950
Service Area	12,902	14,795	15,170	15,742	17,472	17,090	18,468	19,079
North Carolina	253,725	269,763	283,482	279,708	300,967	278,276	287,412	288,508
Ratio Area to State	.051	.055	.054	.056	.058	.061	.064	.066
Average Income From All Farm Products Sold						1939	1944	1949
Service Area						$834	$1,778	$1,863
North Carolina						$715	$1,701	$1,929
Ratio Area to State						1.17	1.05	.97
Average Value of Land and Buildings						1940	1945	1950
Service Area						$2,013	$2,580	$4,774
North Carolina						$2,647	$3,490	$6,490
Ratio Area to State						.76	.74	.74
Cost of Purchased Power	1941	1943	1945	1948	1950	1951	1952	
North Carolina 21 Sampson	1.17¢	1.20¢	1.26¢	1.53¢	1.58¢	1.55¢	0.79¢	
All Co-ops in North Carolina	1.17¢	1.19¢	1.12¢	1.00¢	0.92¢	0.90¢	0.77¢	
Ratio of North Carolina 21 to All	1.00	1.00	1.13	1.53	1.72	1.72	1.03	
Average Monthly Kwh Consumption Per Farm Consumer	1941	1943	1945	1948	1950	1951	1952	
North Carolina 21 Sampson	38	47	58	67	87	101	123	
2 Neighboring Co-ops	34	46	49	73	101	122	147	
Ratio North Carolina 21 to Neighboring Co-ops	1.12	1.02	1.18	0.92	0.86	0.83	0.84	

Considering the present use and probable continued use of LP gas in the service area, and only one area characteristic (number of farms) which shows secular advantage over similar State characteristics, the attainment of the indicated consumption within a 3-year period appears to be unlikely at this time. On the basis of related facts it is estimated that within 3 years 50 percent of the indicated increase for water heaters and ranges will be attained. Seventy percent of that attributed to freezer cabinets, 90 percent attributed to refrigerators, 60 percent attributed to pressure systems, and 10 percent attributed to television receivers are also expected to be realized. In addition, it is estimated that about 5 percent of the indicated increase for air conditioning units, 70 percent of the increase attributed to major productive uses, and 50 percent of the indicated increase for all other uses will be realized within the next 3 years. Kilowatt-hour increases estimated at these rates of increase are shown in Table V.

On the basis of field appraisals previously made in this general area and the attainment of indications included therein, it is estimated that it will take approximately 8 years to achieve the indicated consumption **average** on this system.

COMMERCIAL CONSUMPTION

Listed below is a group of small commercial consumers and their average monthly kwh consumption:

Name	Indicated Average Monthly[a] Kwh Consumption		Actual Average Monthly Kwh Consumption 12 Months Ending December 31, 1952	Percent Actual Use of Indicated Use
	Present	Future[b]		
C. A. Phillips (Store)	811	811	750	92.4
L. H. Caldwell (Store)	726	756	526	72.4
Sam Marshburn (Store)	608	809	305	50.0
Fred Maultsby (Store)	436	458	226[c]	51.8
J. C. Bishop (Store)	134	134	206	153.7
J. W. Merritt (Store)	375	440	173	46.1
Jasper Richardson (Store)	320	320	122	38.1
James Weeks (Store)	116	147	75	64.6

a/ Based on indications by these respondents and average energy requirements as determined by REA on a country-wide basis.
b/ Based on what respondents expect to add in 3 years.
c/ Data available for month of December 1952 only.

Based on factors believed to be significant, this analysis leads to the following estimates, which are certified as being reasonable and may be expected to be attained by the years specified:

Class of Consumer	Calendar Year 1952	1955	1958	1963
Farm	123	165	195	230
Nonfarm Residential	123	145	165	190
Small Commercial	239	290	320	375
Public Buildings	37	50	60	75
Large Commercial (annual)				
Nunnally Lumber Co. (35 kw)	6,720 1/	13,000	13,500	14,000
Highsmith's Mill, Lumber Co. (150 kw)	72,700	100,000	100,000	100,000
Lake Tut, Summer Resort (30 kw)	21,728 2/	24,000	26,000	28,000
Green Bros. Lumber Co. Standby Service (100 kw)	4,400	4,500	4,500	4,500
Burgaw Ball Park (162 kw)	28,800	30,000	30,000	30,000
Volunteer Cement Co. (375 kw)	potential	500,000	500,000	500,000

1/ 8 months consumption.
2/ Connected 6 months.